California and the World Ocean '02

Energy Supply Panel

The Big Picture - By the Numbers - And Issues for the Coast

Paper 410

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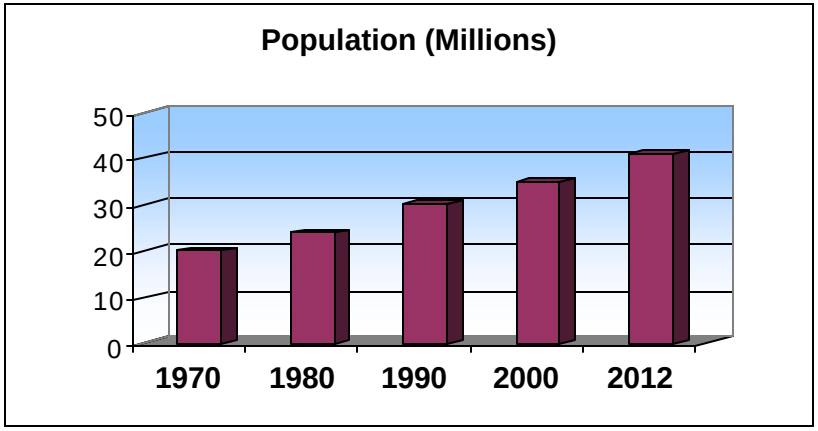
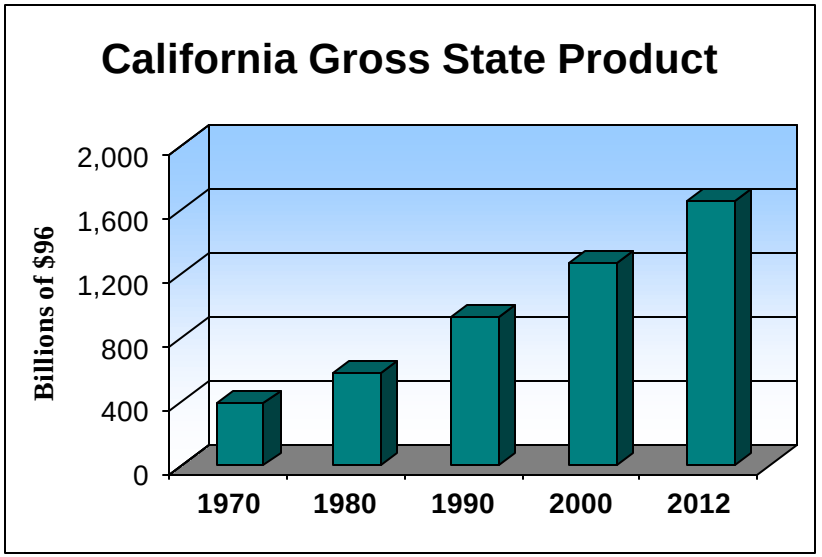
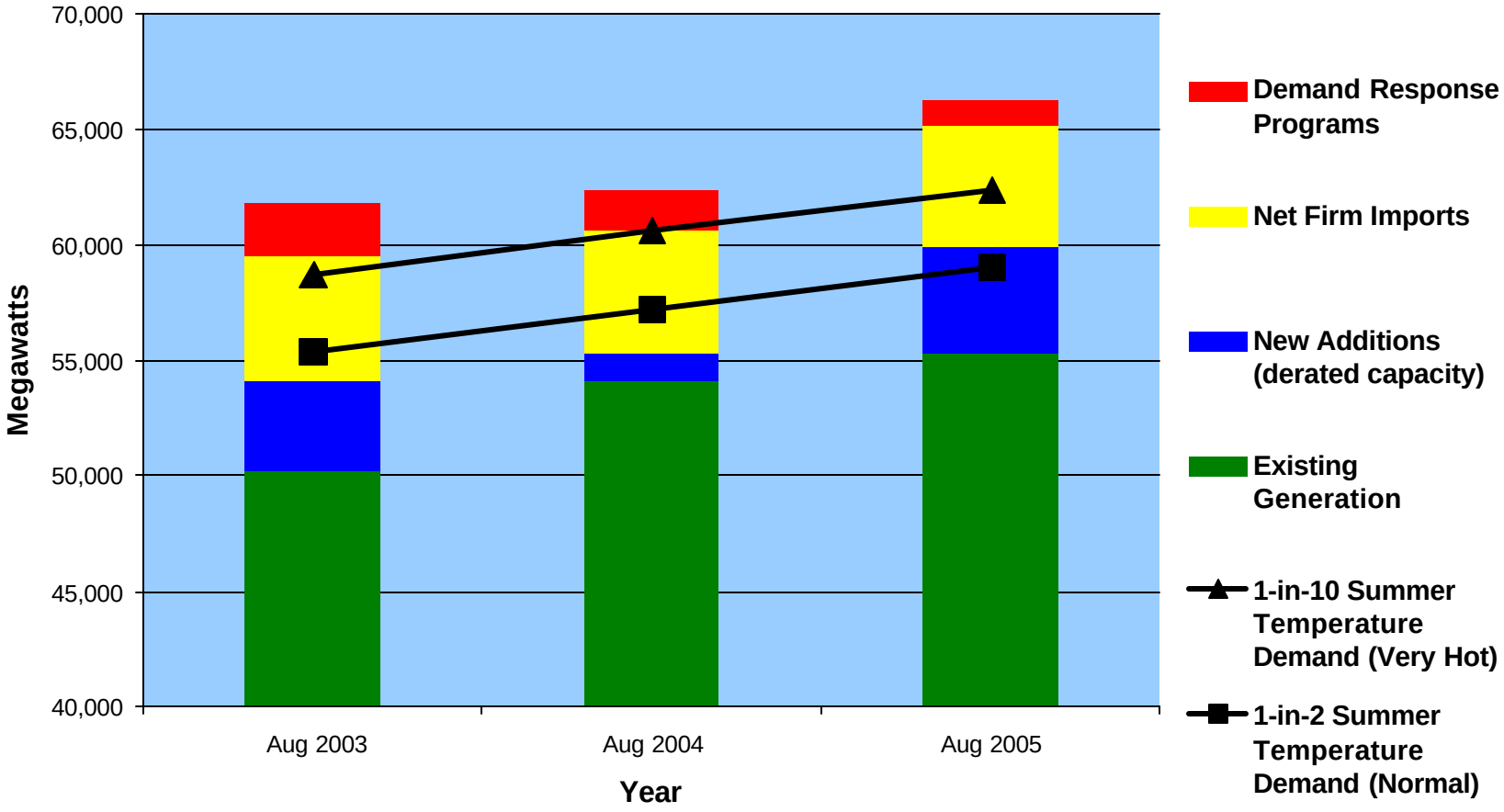
The Basics

- Population is Growing at a rate of 1.7 % per year
- California's Economy is Growing at a rate of 3.5 % per year
- Consequently End User Demand for all Energy Sources is Increasing



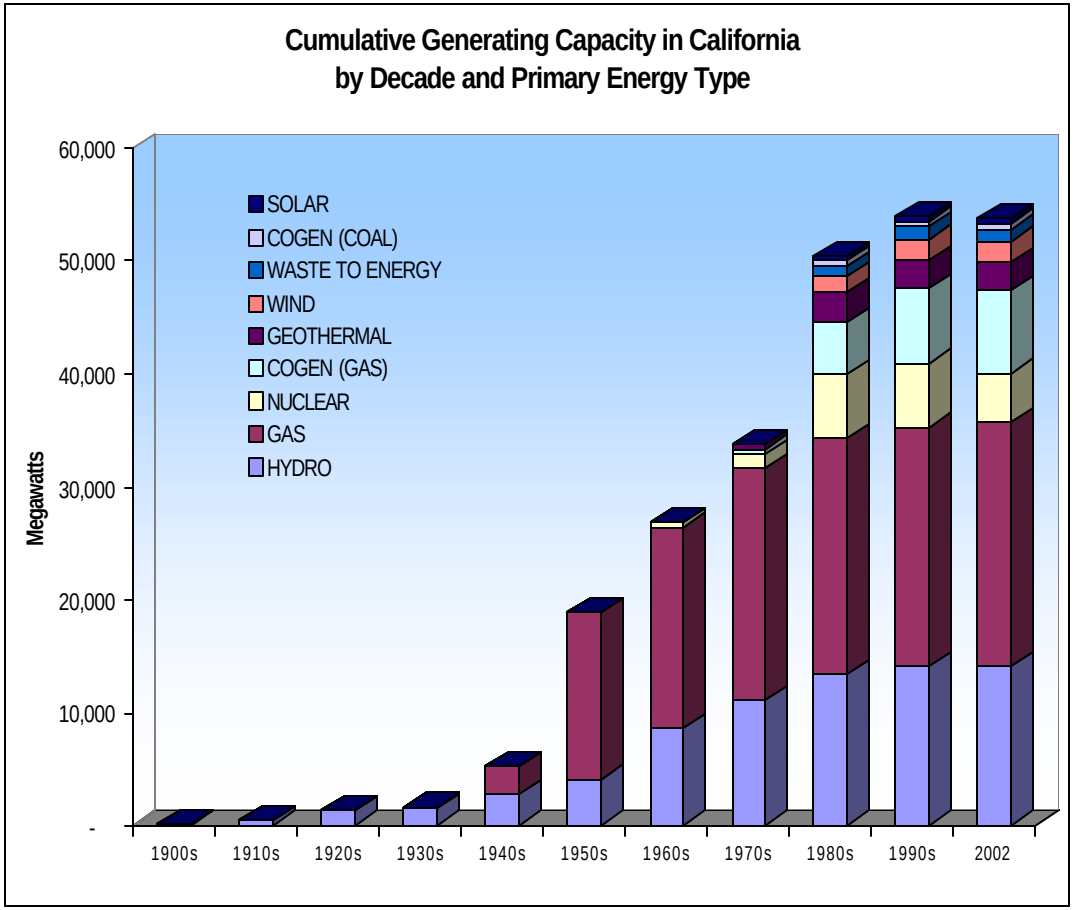


California Statewide Electricity Supply / Demand Balance
1-in-2 & 1-in-10 Summer Peak Demand Forecast



Electricity

- 1,200 Generators Producing 54,000 MWs.
- Natural Gas Provides the Fuel for Most Generation Capacity.



Let's Look at the Coast

- Twenty-Five Generation Stations along the Coast.
- Coastal Power plants Comprise 41% of California's Capacity (22,000 MWs).

Existing Coastal Power Plants

- Constructed in the 1940s and 1950s.
- 33 to 38 Percent Energy Efficient.
- Once-through Cooling from Ocean or Estuaries.
- Requires Retrofit Air Emission Controls.

Future Coastal Power Plants

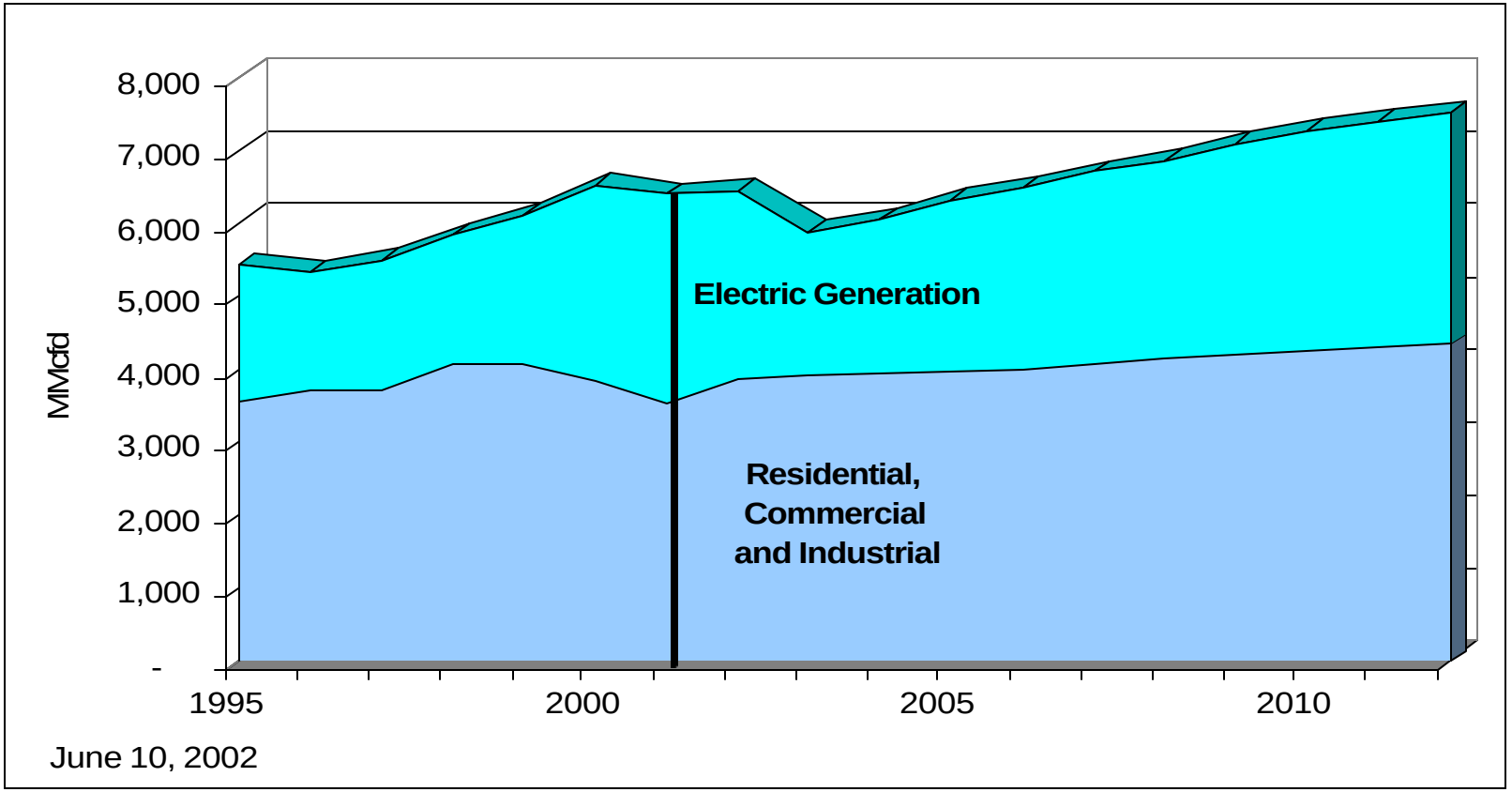
- Refurbish, Replace, Repower, and/or Expand.
  - Natural Gas-Fired Combined Cycle Technologies that will Raise Efficiency Rates to nearly 53%.
  - Once-Through Cooling.
  - Increase Generating Capacity by as much as 73%.
  - Operate More Hours per year.
  - New Plants at 2.5 ppm NOx Compared to Old Plants Over 100 ppm.
- CEC has Approved 2,040 MWs, is Currently Reviewing an Additional 2,400 MWs; Expects Another 3,000 MWs in the Next 3 years.

General Issues for Existing Coastal Power Plants

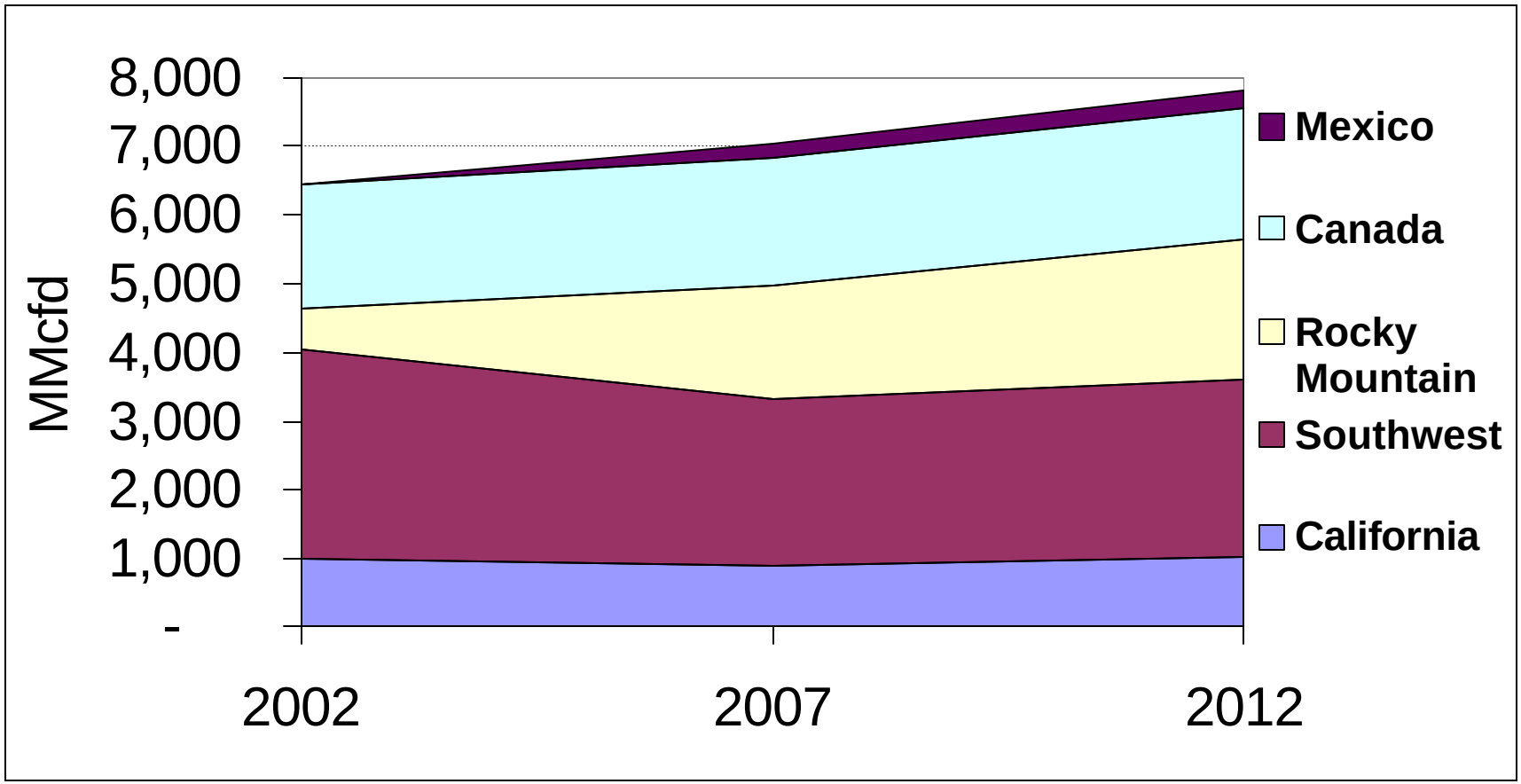
- Capacity and Hours of Modernized Projects will increase, Consequences may include:
  - Impacts on Aquatic Biological Resources
  - Insufficient Air Pollution Emission Reductions
- Local citizens may oppose modernization projects.
- Communities have grown up around existing power plants and plants may not be compatible with coastal land uses.

Natural Gas

Historical and Forecasted Natural Gas Demand

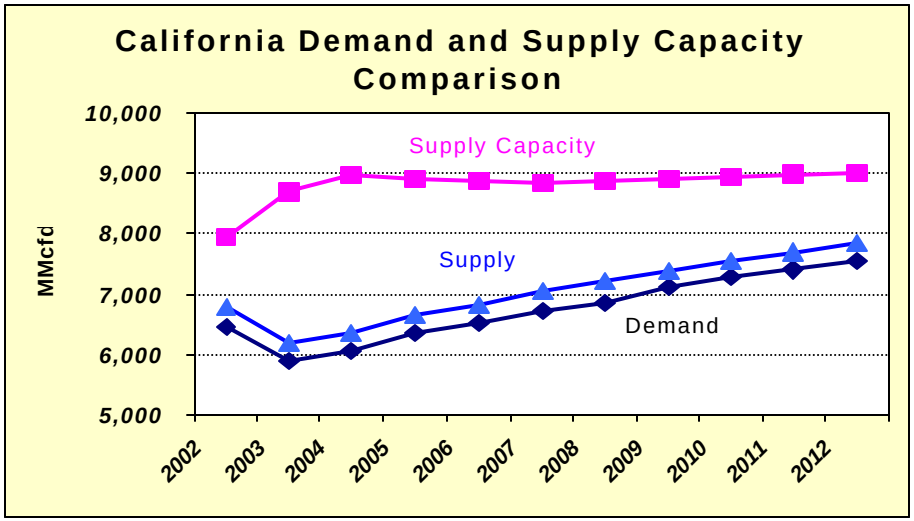


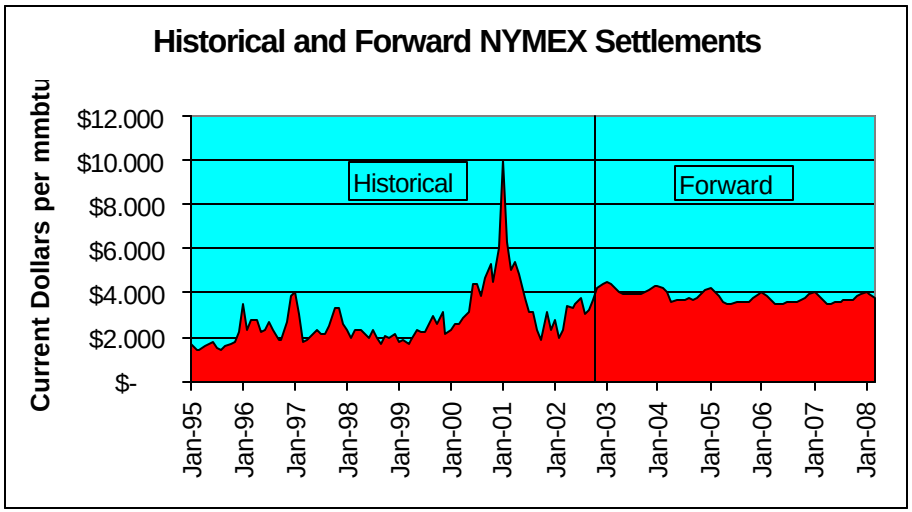
Forecasted California Natural Gas Supply by Source



Issue: Natural Gas Supply & Demand

- California Natural Gas Demand will likely be met with Existing and Planned Pipeline Projects
- Supply and Demand curves are very close.
- New sources of Natural Gas are desirable.





New Sources of Natural Gas

- Natural Gas Pipelines
- Liquefied Natural Gas

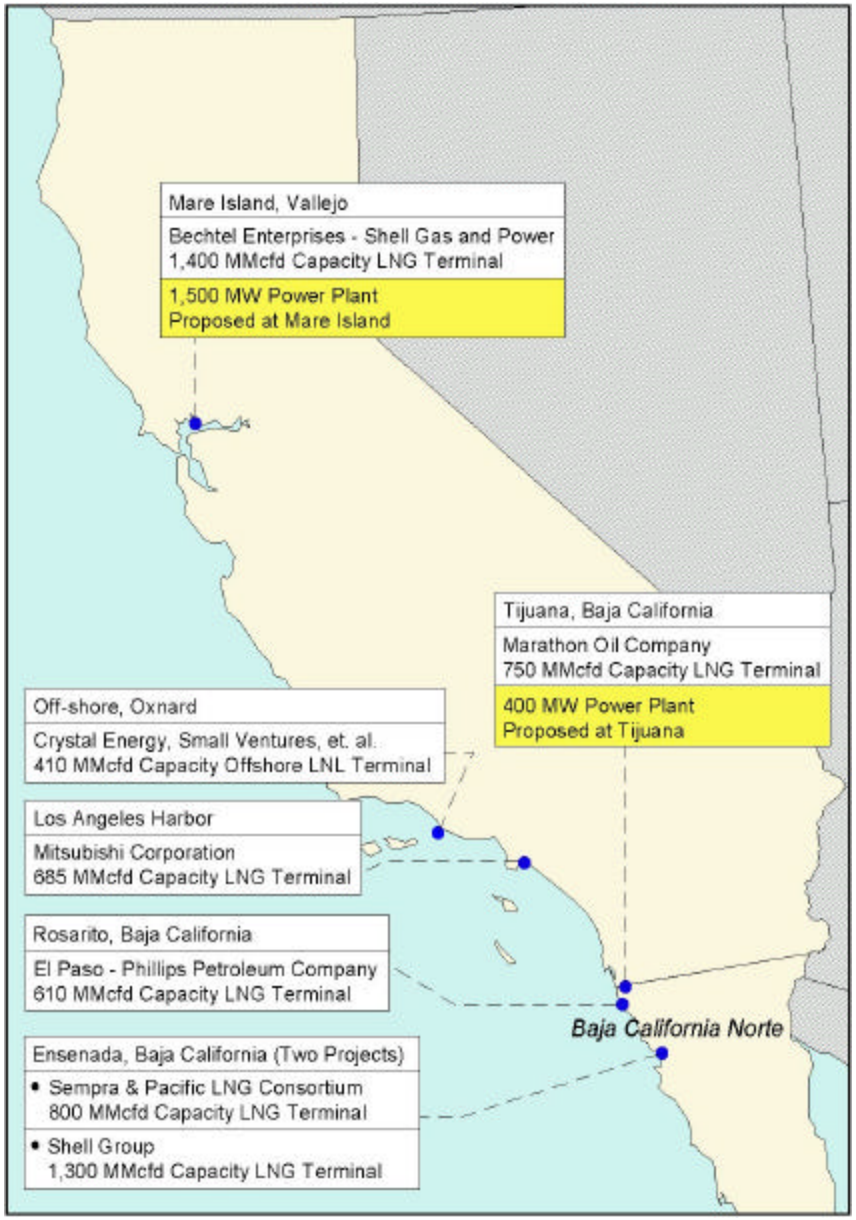
Completed and Proposed Natural Gas Infrastructure Projects Since 2000

Interstate Pipelines to California (MMcfd)			
	Number of Projects	Added Capacity to Calif	Total Capacity Added
Completed	8	787	1,569
Proposed	6	1,736	3,332

California Instate Projects (MMcfd)		
	Number of Projects	Total Capacity Added
Pipelines		
Completed	6	624
Proposed	2	TBD
Storage		
Completed	3	690
Proposed	2	TBD

LNG Proposals

- Rising Gas Prices
- Terminals are proposed in California and Baja California, Mexico
- Power plants proposed at some LNG Terminal Sites



Major Issues for LNG Terminal Development

- Multi-level government permitting
- Public Opposition
- Dredging Impacts
- Coastal Zone Management Plans

Petroleum Products

Transportation Fuels:
Crude Oil and Refined Products

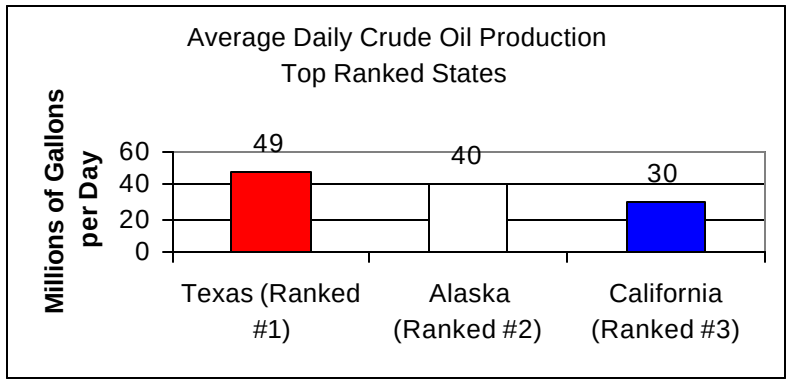
- California is heavily dependent on Marine Transportation for its Transportation Fuels

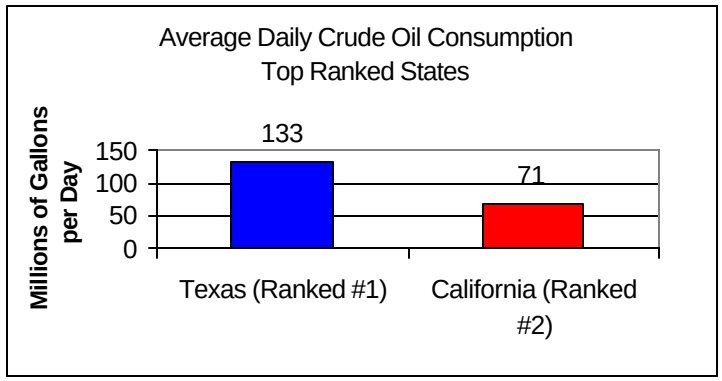
California's Sources of Crude Oil and Refined Products

Even Though Californians are Thrifty in Their Use of Energy and California Ranks Near the Top in the Production of Crude Oil

It still Consumes more Crude Oil and Petroleum Products Than it Produces

California Ranks Near the Top in both Production and Consumption of Crude Oil

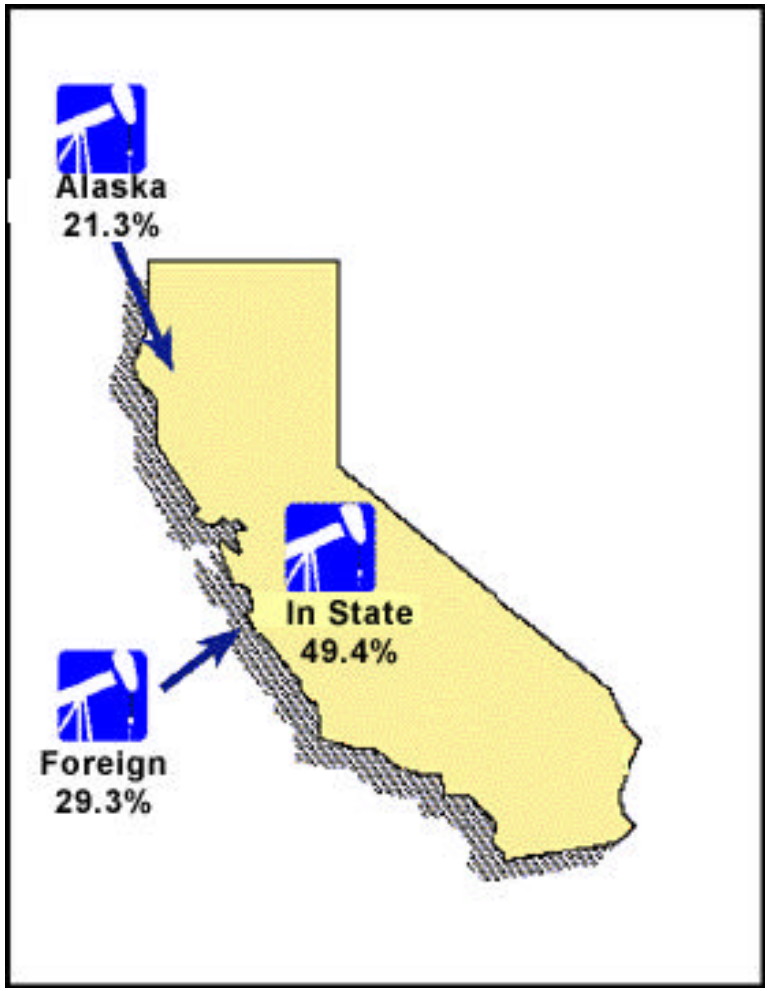




- California:
  - is the third largest oil-producing state
  - is the second largest petroleum consuming state

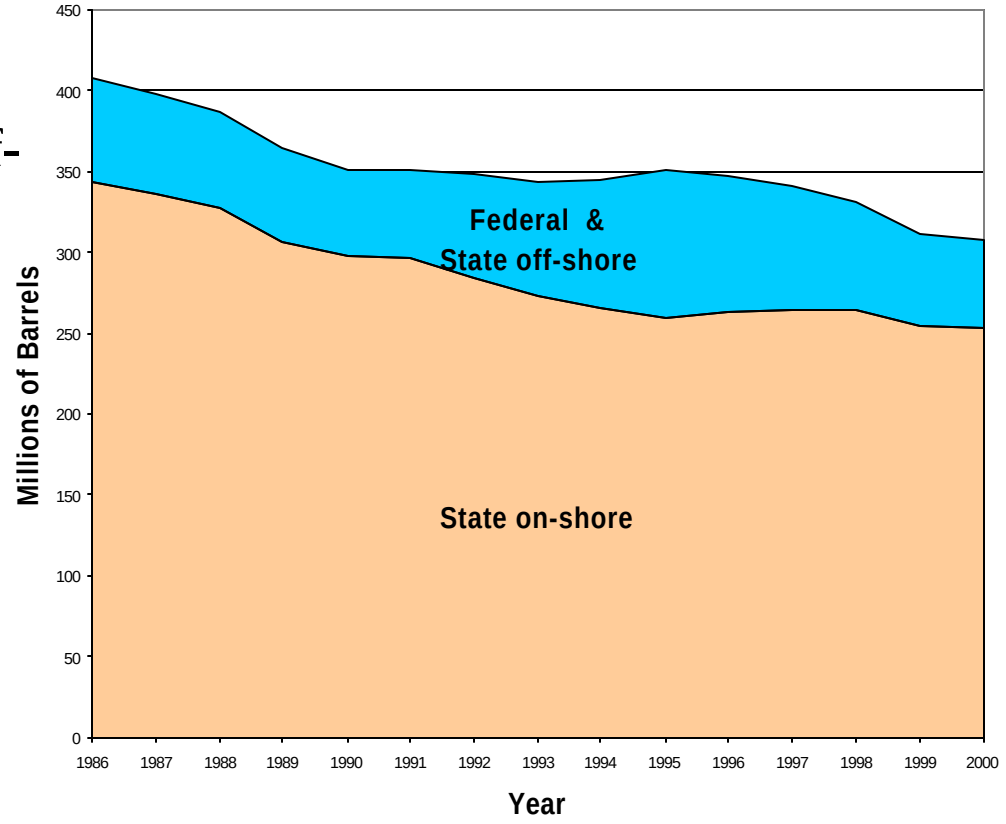
Sources of Crude Oil Supply

- 50% of Crude Oil Comes by Tanker
  - 21.3 % from Alaska
  - 29.3% from Foreign Sources



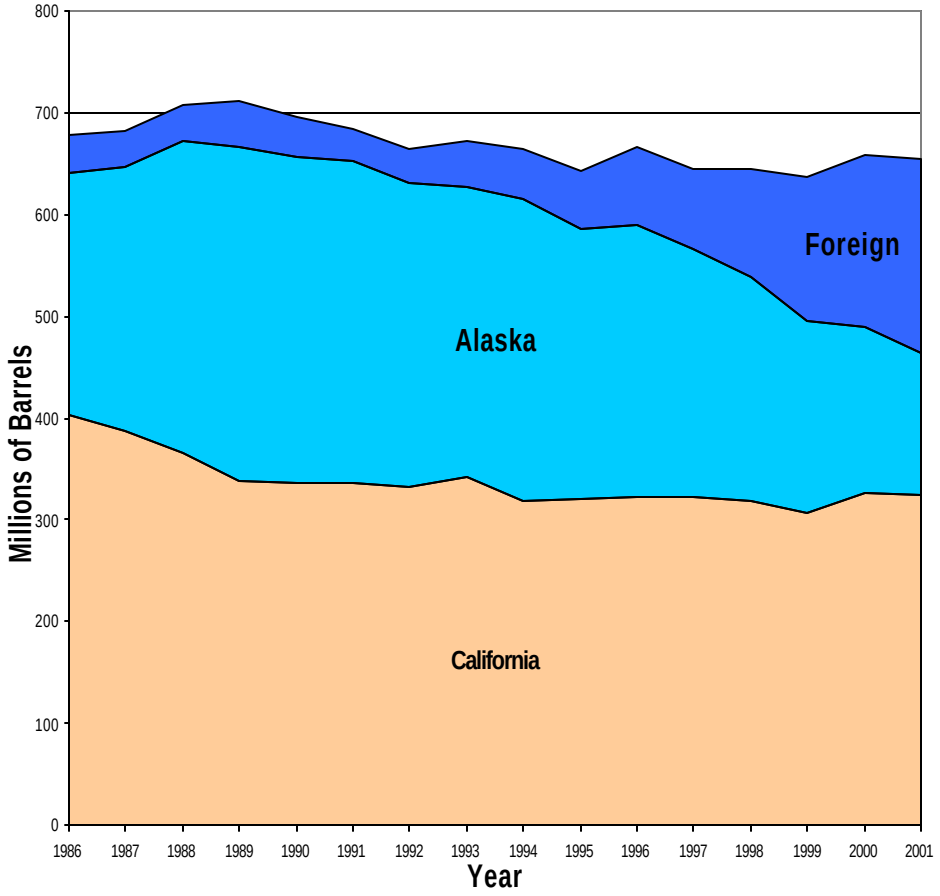
In State Crude Oil Production is Declining

- Since 1995 onshore and off-shore production of crude oil is declining
- Off-shore Crude Oil Comprised 18 % of California Production in 2000

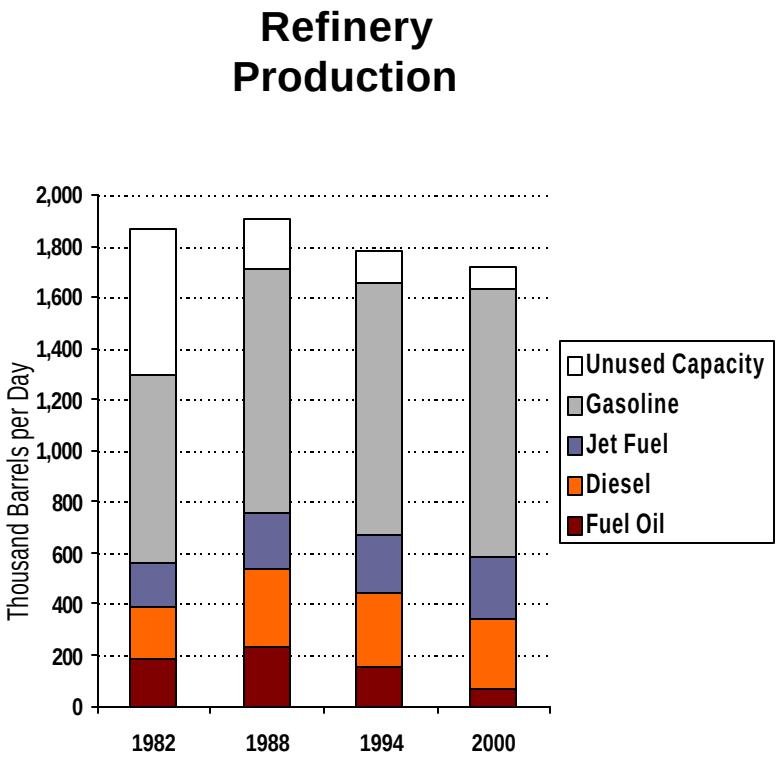


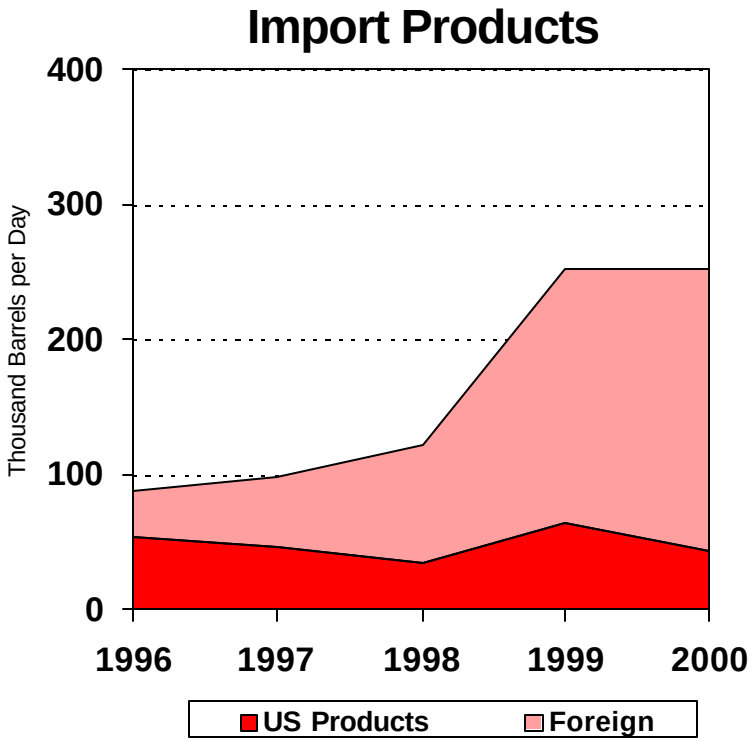
Sources of Crude Oil to California Refineries

- As production from Alaska and California falls, foreign sources make up the shortfall.



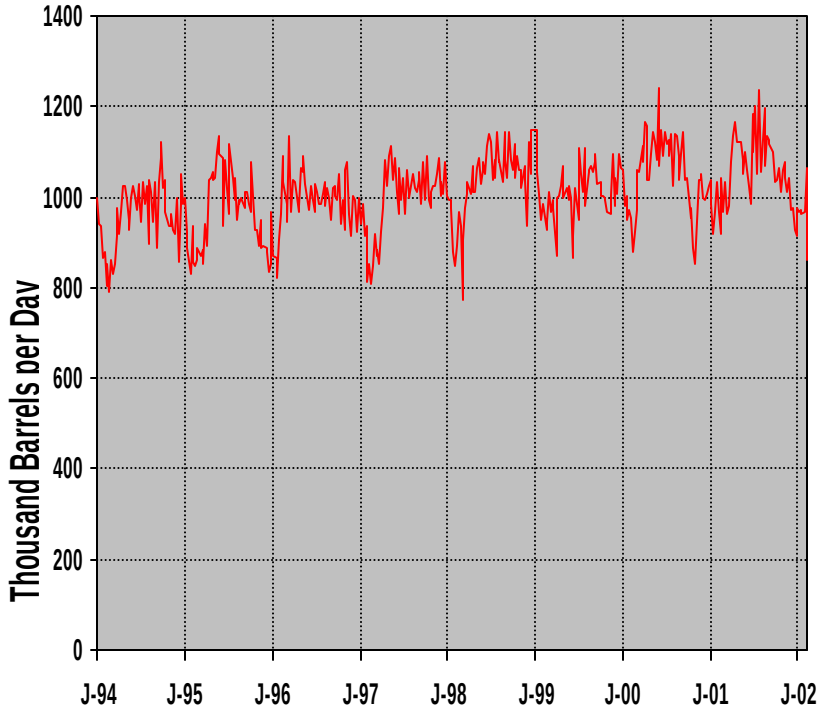
California Refineries Near Production Capacity
Domestic and Foreign Imports Increasing





Demand for Gasoline Continues to Increase, but California Production has not Kept Pace

- Annual California Production has increased by 1.3%.
- Annual Demand has increased by 1.6%.
- Imports make up the difference.



Conclusions

- A Large Portion of California's Total Energy Supply Is Produced at or Imported through Coastal Sites.
- As Pressures for Development Increase, Environmental Impacts are Becoming Important to Decision-making.
- LNG will likely be considered as part of California's Energy Future and may add to On-going Concerns Regarding Water and Aquatic Biological Resources.
- Marine Transport of Petroleum Products is Increasing with a greater Likelihood of Impacts on Ocean Resources.